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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/646,939	08/21/2003	Jerry Joe Langin-Hooper		1762

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LINDA FLEWELLEN GOULD
1665 BRIARGATE BLVD. #101
COLORADO SPRINGS, CO 80920

EXAMINER

KIM, JUNG W

ART UNIT	PAPER NUMBER
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2132

MAIL DATE	DELIVERY MODE
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05/30/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/646,939

Applicant(s)

LANGIN-HOOPER ET AL.

Examiner

JUNG KIM

Art Unit

2132

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 November 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 2-4, 8, 9, 11, 12 and 15 is/are allowed.
- 6) ☒ Claim(s) 1, 5-7, 10, 13 and 14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SF/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

1. This Office action is in response to the amendment filed on 11/9/07.
2. Claims 1-15 are pending.

Response to Arguments

3. Applicant's arguments with respect to the 101 rejections are persuasive. The 101 rejections are withdrawn.
4. Applicant's arguments with respect to the 112 rejections to claims 14 and 15 are persuasive. The 112 rejections to claims 14 and 15 are withdrawn.
5. Applicant's arguments with respect to the prior art rejections of amended claims 1, 5-7, 10 and 14 are moot in view of the new rejections.

Specification

6. The substitute specification filed 8/7/07 has not been entered because it does not conform to 37 CFR 1.125(b) and (c): it is not accompanied by a statement that the substitute specification includes no new matter.

Claim Rejections - 35 USC § 112

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. Claims 10 and 13 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
9. Claim 10 depends on claim 1, and it recites the limitation "M.sub.1,2". There is insufficient antecedent basis for this limitation in the claim.
10. Claim 13 depends on claim 1, and it recites the limitation "B.sub.1,2." There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. Claims 1, 5-7 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over L'Ecuyer "A Tutorial on Uniform Variate Generation" (hereinafter L'Ecuyer).
13. As per claims 1, 5-7, L'Ecuyer discloses a general class of matrix congruential generators having the form $X_{\text{sub}.n} := (AX_{\text{sub}.n-1} + B) \bmod m$, which are used to generate pseudorandom numbers. See pg. 42, equation 3. Hence, L'Ecuyer anticipates a method of generating a pseudo-random number, the method comprising the steps of: establishing initialization values for output series of pseudo-random number matrices $X_{\text{sub}.1} - X_{\text{sub}.k}$; establishing initialization values for variable

transition matrices $A_{sub.1,1-A.sub.k,1}$; establish initialized augmentation matrices $B_{sub.1,1-B.sub.j,1}$; establish first modulus operators $m_{sub.1,1-m.sub.i,1}$; retrieve the transition matrices $A_{sub.1,1-A.sub.k,1}$ and apply to the output series of pseudorandom number matrices $X_{sub.1-X.sub.k}$ to generate a first intermediate matrix value $X_{sub.firsttemp}$; retrieve the augmentation matrices $B_{sub.1,1-B.sub.j,1}$ and apply to the first intermediate matrix value $X_{sub.firsttemp}$ to generate a second intermediate matrix value $X_{sub.temp}$; sequentially apply the first modulus operators $m_{sub.1,1-m.sub.i,1}$ to the second intermediate matrix value $X_{sub.temp}$ to generate an output value of pseudo-random number matrix $X_{sub.n}$ (see also pg. 43, 2nd column); retrieve and extract at least one pseudo-random number from element entries for use as a pseudo-random number; where $k=1$, $j=1$ and $i=1$. Although L'Ecuyer does not expressly disclose storing the respective values in registers, such an arrangement is the conventional means of implementation in the art. Official notice of this fact is taken. It would be obvious to one of ordinary skill in the art at the time the invention was made to store the initialized pseudo-random number matrices $X_{sub.1} - X_{sub.k}$ in a number matrices storage register; store the initialized transition matrices $A_{sub.1,1-A.sub.k,1}$ in a transition matrices storage register; store the initialized augmentation matrices $B_{sub.1,1-B.sub.j,1}$ in an augmentation matrices storage register; store the first output value matrix $X_{sub.n}$ in a number matrices storage register; and provide the pseudo-random number to a long-term storage register for use in a device. One would be motivated to do so for an efficient means of implementing the generator in hardware as

known to one of ordinary skill in the art. The aforementioned cover the limitations of claims 1 and 5-7.

14. As per claim 14, L'Ecuyer discloses a general class of matrix congruential generators having the form $X_{\text{sub}.n} := (AX_{\text{sub}.n-1} + C) \bmod m$, which are used to generate pseudorandom numbers. See pg. 4, equation 3. Hence, L'Ecuyer anticipates an apparatus for generating a pseudo-random number, the apparatus comprising: means for establishing initialization values for output series of pseudo-random number matrices $X_{\text{sub}.1} - X_{\text{sub}.k}$; means for establishing initialization values for variable transition matrices $A_{\text{sub}.1,1} - A_{\text{sub}.k,1}$; means for establishing initialized augmentation matrices $B_{\text{sub}.1,1} - B_{\text{sub}.j,1}$; means for establishing first modulus operators $m_{\text{sub}.1,1} - m_{\text{sub}.i,1}$; means for retrieving the transition matrices $A_{\text{sub}.1,1} - A_{\text{sub}.k,1}$ and applying to the output series of pseudorandom number matrices $X_{\text{sub}.1} - X_{\text{sub}.k}$ to generate a first intermediate matrix value $X_{\text{sub}.firsttemp}$; means for retrieving the augmentation matrices $B_{\text{sub}.1,1} - B_{\text{sub}.j,1}$ and applying to the first intermediate matrix value $X_{\text{sub}.firsttemp}$ to generate a second intermediate matrix value $X_{\text{sub}.temp}$; means for sequentially applying the first modulus operators $m_{\text{sub}.1,1} - m_{\text{sub}.i,1}$ to the second intermediate matrix value $X_{\text{sub}.temp}$ to generate an output value of pseudo-random number matrix $X_{\text{sub}.n}$; means for retrieving and extracting at least one pseudo-random number from element entries for use as a pseudo-random number; where $k=1, j=1$ and $i=1$. Although L'Ecuyer does not expressly disclose storing the respective values in registers, such an arrangement is the conventional means of implementation in the art.

Official notice of this fact is taken. It would be obvious to one of ordinary skill in the art at the time the invention was made to store the initialized pseudo-random number matrices $X_{sub.1} - X_{sub.k}$ in a number matrices storage register; store the initialized transition matrices $A_{sub.1,1} - A_{sub.k,1}$ in a transition matrices storage register; store the initialized augmentation matrices $B_{sub.1,1} - B_{sub.j,1}$ in an augmentation matrices storage register; store the first output value matrix $X_{sub.n}$ in a number matrices storage register; and provide the pseudo-random number to a long-term storage register for use in a device. One would be motivated to do so for an efficient means of implementing the generator in hardware as known to one of ordinary skill in the art. The aforementioned cover the limitations of claim 14.

15. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over L'Ecuyer in view of Knuth, The Art of Computer Programming, Vol. 2, Seminumerical Algorithms (hereinafter Knuth)

16. As per claim 10, the rejection of claim 1 under 35 USC 103(a) as being unpatentable over L'Ecuyer is incorporated herein. L'Ecuyer discloses applying a modulus operation, which anticipates the limitation "wherein the first modulus operators $m_{sub.1,1} - m_{sub.j,1}$, $m_{sub.1,2} - m_{sub.j,2}, \dots m_{sub.1,n+d-k} - m_{sub.j,n+d-k}$ comprise a uniform variable modular reduction." Although, L'Ecuyer does not disclose discarding certain pseudo-random numbers which are not uniformly distributed, it is well known in the art that pseudo-random generators have a tendency to produce values that are not

uniformly distributed. In such instances, these values are eliminated to maintain uniformly random values. For example, Knuth discloses improving randomness of a random number generator by discarding certain pseudo-random numbers from pseudorandomly generated values. Pg. 35, 3rd full paragraph. Therefore, it would be obvious to one of ordinary skill in the art at the time the invention was made to discard certain pseudo-random numbers which are not uniformly distributed to maintain a set of uniformly random numbers. The aforementioned cover the limitations of claim 10.

Allowable Subject Matter

17. Claims 2-4, 8, 9, 11, 12 and 15 are allowed.

Conclusion

18. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Communications Inquiry

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jung W. Kim whose telephone number is 571-272-3804. The examiner can normally be reached on M-F 9:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gilberto Barron can be reached on 571-272-3799. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Jung Kim/
Primary Examiner AU 2132